
UTAH DEPARTMENT OF TRANSPORTATION

TECHNICAL BULLETIN MT-03.01

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Tire Rubber Modified Hot-Applied Chip Seal Coat

A hot applied application of tire rubber modified (TRM) PG asphalt binder is applied to the pavement, followed by an application of pre-coated, uniformly graded aggregate. The 5-6% tire rubber, dissolved in an elastomer modified asphalt binder (PG70-28), enhances adhesion for better chip retention. High application rates can be achieved with no appreciable bleeding. The dissolved tire rubber contributes carbon black, which decreases oxidation and UV degradation rates. Once the TRM PG asphalt binder cools, the mat can be swept and opened to traffic. The process is a rational method of utilizing waste tire rubber.



PROPER APPLICATION

This surface application is suitable for chip sealing high volume, interstate and primary routes and is particularly suitable where fast curing times and minimal traffic disruptions are desired. This process can also be used on city/county streets where bleeding and tracking must be avoided. Application details include: (1) Placing between May 15 and August 31, placing on dry pavements, and when pavement temperatures are 70 °F in the shade and rising.

SPECIFICATIONS/DETAILS

A special provision 02785 is available. It includes a generic specification for the Tire Rubber Modified PG Binder (PG70-28TRM), pre-coated cover aggregate, and other construction details. As with any Chip-Seal application, basic “state-of-the-art” construction practices must be addressed. The TRM Binder should be sprayed at temperatures from 350 to 360 °F. Cover aggregate must be pre-coated in a pug-mill with approximately 0.1 % PG58-22 and stockpiled. The pre-coated aggregate must be placed immediately after spraying the binder. Minimums of two pneumatic-tired rollers are used after the cover material has been spread. The mat can be swept soon after rolling, when the TRM binder reaches an ambient temperature. No fog sealing is required. Complete requirements can be found in the Special Provision. A successful TRM Hot-Applied Chip Seal was successfully placed on I-80, Echo Jct. to Castle Rock. Granite Construction Company was the prime contractor.

COST INFORMATION

TRM Modified Binder is typically sprayed around 0.38 GSY resulting in an effective coverage of approximately 0.35 GSY when cooled, whereas a CRS-2P is sprayed about 0.45 GSY. The higher CRS-2P rate accounts for approximately 35% water and results in an effective residual coverage of approximately 0.30 GSY. The TRM Hot-Applied process requires pre-coated chips: whereas a CRS-2P process involves fog-sealing the completed mat with CSS emulsion. Normal traffic flow is allowed back on the TRM mat after sufficient rolling and sweeping (generally within 1 to 2 hours). Emulsions require longer cure times and additional traffic handling. Based on these factors and a 10-year usage in Texas, a typical cost for the hot-applied system is \$0.809 per square yard, versus \$0.917 per square yard for the CRS-2P application.

RELATED APPLICATIONS

Surface applications ranked to anticipated performance for severe service conditions:

1. Open-Graded Friction Coarse- design life: 8-9 years.
2. Ultra Thin Bonded Wearing Courses (a high polymer modified asphalt emulsion applied to a pavement surface followed immediately by a thin lift of hot mix asphalt). Design life: 7-8 years.
3. Chip Seals using pre-coated chips and a hot applied tire rubber modified PG binder (PG70-28TRM). Design life: 6-8 years.
4. Macro Surfacing (A tightly controlled chip-seal operation using a specially designed, chemical setting emulsion. Design life: 5-7 years.
5. Chip seal using a polymer modified emulsified asphalt (CRS-2P, HMFS-2P, HFRS-2P, LMCRS-2). Design life: 4-5 years.

FURTHER INFORMATION

Contact Cameron Petersen, @ (801)965-4296, cameronpetersen@Utah.gov

“A Basic Emulsion Manual”, Asphalt Institute Manual Series No. 19-second edition

“Chip Seal Best Practices” by Larry Gay, Region 4 Materials Engineer, lgay@Utah.gov
